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Enabling Digital Literacy

Development of Meso-Level Pedagogical Approaches

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FAGFELLEVDERT ARTIKKEL

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English abstract

There are some tensions between high-level policy definitions of “digital literacy” and actual teaching practice. We need to find workable definitions of digital literacy; obtain a better understanding of what digital literacy might look like in practice; and identify pedagogical approaches, which support teachers in designing digital literacy learning. We suggest that frameworks such as Problem Based Learning (PBL) are approaches that enable digital literacy learning because they provide good settings for engaging with digital literacy. We illustrate this through analysis of a case. Furthermore, these operate on a meso-level mediating between high-level concepts of digital literacy and classroom practice.

Keywords: Problem Based Learning, Digital literacy, Pedagogical strategies.

Introduction

In recent years there has been a growing interest in terms such as digital literacy and digital competence. Within the EU “digital competence” has become one of eight key competencies for lifelong learning, and is defined as the confident and critical use of digital technologies for learning, work and leisure. Digital literacy comprises the skills required to achieve digital competence, such as the use of computers: “to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet” (European Communities 2007, p. 7). The notion of digital competence and literacy not only includes discourses on national- and international competitiveness, innovation and productivity, but also concerns people being marginalized or left behind by the digital revolution due to lack of access to technologies, and the ability to use them. In addition, prominent discourses within the area of digital literacy have revolved around young people as a highly digitally literate generation, as reflected in terms such as “Digital Natives” (Prensky 2001) or the “Net generation” (Oblinger & Oblinger 2005). While the ideas of young people as particularly digitally literate do have some merit, it is also becoming increasingly clear that not all young people acquire the necessary competencies or literacies through their informal use of technology. Educational institutions therefore play a pivotal role in ensuring that all young people attain the necessary competencies, in particular because those who seem most likely to be left behind are those who are already socio-economically marginalized (Facer et al. 2003; Selwyn 2009).

Thus, there are plenty of reasons why educational institutions should engage with teaching and enabling digital literacies, but also a number of problems. First of all, teachers and educators may not be particularly digitally literate themselves, and adopting digital media entail new challenges for both students and teachers (Buckingham 2006; Christensen & Tufte 2005). Secondly, the academic and popular literature on “digital literacy” is plentiful and does not seem to present a unified, universal approach to or conception of what exactly “digital literacy” is. We do not propose this should be the case, as there are good reasons why detailed, potentially prescriptive lists of “digital literacies” can be highly problematic (Lankshear & Knobel 2006). However, the diversity and complexity of the issue is a challenge for both practitioners and researchers. For practitioners it is a challenge to design for learning which supports students in developing or strengthening “digital literacy”, when it might not be clear what actually constitutes “digital literacy”. We further argue that there are some tensions between high-level policy definitions of “digital literacy” and then actual, situated teaching practice. Therefore, a pertinent research question seems to be: What does “digital literacy” look like in practice, and how can it be taught or enabled?

In order to address these questions we discuss the tensions and propose that there is a need to find, not only workable definitions of digital literacy, but also learning approaches or pedagogical strategies, which can support teachers in designing for learning “digital literacy”. We suggest that we can think of particular pedagogical approaches such as Problem Based Learning (PBL) as stable approaches, which can act as enablers for learning digital literacy because they provide good settings for engaging with digital literacy practices. Further, that these can be seen as residing on a meso-level mediating between high-level, abstract macro-concepts of digital literacy and then situated classroom practice. The pedagogical approach, however, cannot stand on its own, but needs to include workable and theoretically viable understandings of digital literacy. For this purpose, we use a framework for digital literacy proposed by David Buckingham (Buckingham 2006) and discuss this in relation to some less developed, but interesting, notions of digital literacies (Jenkins et al. 2006). To further develop pedagogical approaches which can enable digital literacy, we argue that

we need to study how digital literacy unfolds in practice. For one thing, to get a better understanding of how to design for learning digital literacy, but also to get a better understanding of what digital literacy as a practice might look like. The aim is not to arrive at a definition of digital literacy, but rather to suggest pedagogies which are workable for practitioners and can enable the development of digital literacy among students.

We argue that PBL settings are good arenas for digital literacy practices to unfold, and illustrate this through the presentation of a case. The case features eight young people's work with an open-ended problem, which resulted in a complex and well argued multi-modal presentation. The case is somehow unusual, in terms of the setting and the resources available to the young people, and also they seemed to be above average performing students. Therefore, we do not claim that the case or example can be easily transferred to a regular school setting, but we argue that we can extract some interesting insights about digital literacy in action and pedagogical approaches.

Digital literacy – in a Macro, Meso and Micro perspective

With the increased focus on digital literacy, we have experienced the development of various definitions and frameworks for digital literacy. Some of these are what Lankshear & Knobel (2006) term “standardized operationalizations” of digital literacy, of which some are long lists of specific operations (assumed to be the building blocks of digital literacy). Others are of a more conceptual nature concerned with meaning, rather than chains of “keystrokes”. These frameworks are what we would term macro policy perspectives, which pose very different challenges to actual, local, classroom practices (micro-practices); and also entail different theoretical problems. While the more conceptual, broader definitions (such as the EU definition of Digital Competence) are difficult to immediately translate into workable teaching methods and pedagogies, the detailed, prescriptive lists are in danger of alienating or marginalizing teachers by imposing curricular limitations onto classroom teaching. The latter is particularly a problem within educational traditions relying on a “curriculum approach” (Westbury 1998). As pointed out by several authors translating literacy needs into smaller curricular units focusing on specific types of literacy can be problematic (Clark et al. 2009; Lankshear & Knobel 2006):

[...] we should think of «digital literacy» as shorthand for the myriad social practices and conceptions of engaging in meaning making mediated by texts that are produced, received, distributed, exchanged etc., via digital codification. Digital literacy is really digital literacies. (Lankshear & Knobel 2006, p. 17)

Their argument is that digital literacies are composite and situational accomplishments, which should not be reduced to piece-meal curricular units, but taught as an organic, complex engagement with different literacy practices.

In countries where the educational model resembles the German “didaktik” tradition (Westbury 1998), teachers have a higher degree of autonomy in terms of content and pedagogical method. This, however, can be problematic when teachers are not themselves digitally literate, and therefore potentially have trouble identifying ways in which to work fruitfully with digital media. Teachers within this tradition may then be left more to themselves in finding ways to translate general concepts of digital literacy into workable classroom practices involving digital technologies. For example in Denmark and Norway a common experience is that *access* to digital technologies in the classrooms is good, but teachers find it difficult to integrate it in a pedagogically sound and interesting way,

and may lack the necessary competencies themselves (Christensen & Tufte 2005; Hatlevik et al. 2009; Holm Sørensen et al. 2010).

At one end of the spectrum, it seems that the level of macro-political definitions too rigidly infuses itself into the micro-level of actual classroom practice. This can potentially alienate teachers and result in inflexible, prescriptive curricular “literacy chunks” that overlook the complexity of these literacies. At the other end of the spectrum, we can also see how it can be difficult for teachers to embed digital technologies and translate broader concepts of digital literacy into meaningful classroom practices. We therefore argue that it might be fruitful to think of pedagogical approaches, such as PBL as meso-level pedagogies or strategies which can act as “boundary objects” between macro-level policy descriptions and micro-level classroom practice (this might also encompass other approaches, such as action learning, discovery learning or progressive inquiry). The understanding of the term meso-level we adopt from Jones & Dirckinck-Holmfeld (2009) who describe it as: “The meso level at its simplest can be thought of as the level of interaction that was intermediate between small scale, local interaction and large-scale policy and institutional processes” (Jones & Dirckinck-Holmfeld 2009, p. 11). Our argument is that such approaches are flexible and open to teachers’ repurposing and interpretations, while they also offer a certain level of structure and scaffolding, as they are sound pedagogical frameworks. Furthermore, they are approaches that can support or enable students in becoming digitally literate, which we illustrate through the case and with reference to existing literature and experiences.

Digital literacies

The aim of this paper is not to arrive at definitions of digital literacy, but to suggest pedagogical approaches which are workable for practitioners and can enable digital literacy. Therefore, we adopt a conceptual and analytic framework for digital literacy developed by Buckingham (2006), because it is strongly rooted in notions of critical literacy, and because it specifically aims at bridging “formal” literacies and experiences from cultural practices outside school.

Buckingham's digital literacy framework consists of four essential components, which have been further developed on the basis of existing, more commonly agreed upon, definitions of media literacy: *representation*, *language*, *production* and *audience* (Buckingham 2006, pp. 267–268). *Representation* concerns the ability to critically assess and reflect on issues such as authority, reliability and bias, to notice whose voices are being heard, and whose are silenced. *Language* concerns the ability to understand the “grammar” of various forms of communication and the codes and conventions of different genres. *Production* entails a fundamental understanding of who is communicating to whom, and why, which also encompasses awareness of commercial interests and influences. Finally, the notion of *audience* concerns an awareness of one's own position, both in terms of being targeted by communications and in terms of participating in communications as critical recipients, active cultural consumers and co-producers. Buckingham (2006) argues that these four essential components can be used as a general framework for producing more specific categories such as web literacy or gaming literacy. Furthermore, he stresses that these dimensions should not only be understood as analytical skills of “reading” media, but also in relation to more productive activities of “writing” media. We use these four aspects of critical digital literacy to analyse and discuss examples from the case, but will also include some ideas on digital literacies proposed by Jenkins et al. (2006):

Play – the capacity to experiment with one’s surroundings as a form of problem-solving.

Performance – the ability to adopt alternative identities for the purpose of improvisation and discovery.

Simulation – the ability to interpret and construct dynamic models of real-world processes.

Appropriation – the ability to meaningfully sample and remix media content.

Multitasking – the ability to scan one’s environment and shift focus as needed to salient details.

Distributed Cognition – the ability to interact meaningfully with tools that expand mental capacities.

Collective Intelligence – the ability to pool knowledge and compare notes with others toward a common goal.

Judgment – the ability to evaluate the reliability and credibility of different information sources.

Transmedia Navigation – the ability to follow the flow of stories and information across multiple modalities.

Networking – the ability to search for, synthesize, and disseminate information.

Negotiation – the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms. (Jenkins et al. 2006, p. 4)

While these suggestions for literacies are more tentative and in-development than the literacies developed by Buckingham (in terms of drawing on existing frameworks), the authors point out that they extend and supplement existing or traditional literacies. In this way they represent some interesting ideas, which can supplement more classic definitions of digital literacy. Some of the points, however, overlap slightly, and for simplicity, we group them into three overarching categories:

- Presentation, Production and Performance (play, performance, simulation, appropriation)
- Collaboration and work skills (multitasking, distributed cognition, collective intelligence)
- Retrieving and participating in information practices (transmedia navigation, networking, negotiation)

In particular, we touch upon the presentational and performative means, but we also find the ideas around collaboration and work skills to be interesting, as such concepts do not seem to be part of Buckingham’s framework. These aspects, and those highlighted by Buckingham, are also part of contemporary high-level notions of digital literacy within a Scandinavian context (digital kompetanse/kompetence or “dannelse”) where notions such as: basic ICT operations and concepts; production and publication; networking and communication; multiple, multi-modal sources; analysis and interpretation; problem solving with ICT; and social and ethical considerations are all concepts which are being implemented in national goals, curriculum and guidance papers in schools, as aspects of developing digital literacy (Hatlevik et al. 2009; Holm Sørensen et al. 2010, pp. 49–50); and in Norway particular tests have been developed so as to monitor the development of (some of) these competencies (Hatlevik et al. 2009). As there are multiple overlaps between these high-level Scandinavian literacy descriptions, and the frameworks suggested by Buckingham (2006) and Jenkins et al. (2006), we use the latter to analyse the case to avoid conceptual confusion and translation problems.

Case description

The data presented in this paper were collected during an International Power Users Symposium held in San Juan, Costa Rica in 2005. We refrain from going deeply into the Power Users Project and from describing the case in too much detail, because we do not argue that the case is immediately

transferable to other settings, and also because the case has been described in previous publications (Ryberg 2007; Ryberg & Dirckinck-Holmfeld 2008). Suffice to say that during a three-day symposium six teams of young “power users” from different countries worked on a series of open-ended challenges they had chosen. It was agreed in the project that each of the teams should work with global challenges inspired by the UN 2015 Millennium goals, but apart from this each research team had the freedom to design and organize the learning processes (and research design) according to their own preferences. On the final day the teams presented their findings to researchers, practitioners and business people attending the event. Throughout the symposium one of the authors was part of a research team following and supporting the Danish team, who had chosen to work with the problem of “how to use technology to reduce poverty in the world”. The Danish team consisted of four boys and four girls (age 13–16) from two different cities in Denmark (Aalborg and the Copenhagen area).

The research design developed by the research team (a professor, a PhD student and three master students acting as facilitators and helpers) focused on qualitative methods and encompassed intensive participatory observation and documentation of their work. Data collected during the symposium included approximately 20 hours of video data, field notes, and the materials students had worked with or produced (digital and hand-written notes, documents and files). Finally, we conducted eight individual semi-structured interviews during the event, and two group interviews afterwards. The 20 hours of video and interview data were imported into Transana (a software tool for managing and analysing video/audio), to gain an overview of the data and to be able to analyse the entire learning process.

The pedagogical design for the Danish team was founded on a problem-oriented, project based learning approach, as we wanted the learning and inquiry process to be managed mainly by the young people. This was inspired by the pedagogical foundation of Aalborg University, which is called the “Aalborg PBL Model” (Kolmoset al. 2004) or “Problem Oriented Project Pedagogy” (Dirckinck-Holmfeld 2002). One of the main differences between this model and other interpretations of PBL is that problems are not defined by a “teacher” but continuously negotiated and decided by “students”. Likewise, learners identify and decide on the theories, methods and tools which can help them address the problem (often inspired by the lectures available on that semester and with help from their supervisor). There are, however, many different interpretations of what PBL is, to which we cannot do justice in this paper. We therefore use PBL as a broad concept to cover a wide array of more student centred learning approaches that feature processes of enquiry, and with a focus on critical knowledge production and dissemination, rather than the acquisition of a given body of knowledge.

In our case, the approach was to create a relatively open setting for the young people to act in, rather than controlling in detail what they should learn, and how they should organize their work. To support them we arranged a lecture on poverty and contacted some potential expert witnesses to be interviewed. Before the symposium we organized workshops where the students could work on defining their problem and discuss possible methods for studying poverty. Finally, we provided them with a number of tools: four Tablet PCs, relevant software, a Mac notebook, a mini-disc recorder and two video-cameras to support their enquiry, collection of data and the production of the presentation.

Because identifying and further defining the problem to work with was negotiated with (and between) the young people, a lot of effort was put into this process ahead of the symposium. The

group therefore had relatively vague ideas and conceptualisations of poverty when they arrived in Costa Rica, and they were not entirely sure how to define and address their problem. Their concrete work then really began on 7 August (in the evening) where they started to create interview guides and discuss ideas for the presentation. It was concluded on 10 August when they presented their findings to the symposium attendees.



Figure 1: Examples from their final presentation

The format of the final presentation was highly multi-modal and it combined many different media and resources (music, pictures, animation, videos from interviews, and graphs with information about poverty) – see Figure 1. The presentation was also conceptually complex, as they collected facts, discussion issues and ideas from many different sources, and synthesized these into coherent arguments. The main arguments in the presentation focused on “taxes” and “education”. For example, education was presented as a means to provide civic engagement and reduce poverty, but many other issues were drawn in as causes of, or solutions to, poverty (e.g. corruption, lack of secondary education, and the necessity for young people to improve their ICT skills and desire to learn).

It is difficult to fully convey the complexity of the final presentation, but a summary is available online¹. Likewise, it is challenging, within a single paper, to provide an overview of their entire learning process. However, the 20 hours of video-data and other material (e.g. field notes and material used or produced by the young people) have been carefully analysed and a full description and analysis of the entire learning process is available in Ryberg (2007). Although the examples we analyse are small fragments of a much longer and complex process they reflect general patterns of behaviour and how they worked with their challenge, rather than being extraordinary moments within the entirety of the process. For the purpose of this paper, we focus on some of their preliminary discussions and reflections related to the development of their final presentation, as these illustrate well their varied knowledge of different genres and means of communication.

Case examples

The two extracts from their conversations (Table 1, Table 2), which we discuss and analyse, originate from the first full day of work (Monday, 8 August 2005). On the previous night the young people worked in smaller groups, creating interview guides and discussing ideas for the presentation. In the extracts they are discussing the ideas they generated. The first idea is a role play involving the audience

(1), while the second is an interactive animation based on a film or cartoon (Table 2). In relation to the latter they are discussing how to create a multi-modal representation of some of their ideas. One suggestion is a “matchstick man” animation; the other includes recording the interviews and using them to document their points. It is important to note that the discussions were organized, structured and moderated by the young people themselves, with little intervention from the research team. Initially, one of the master students moderated the discussion, but had trouble coping with a cacophony of suggestions and asked the participants “to speak one at a time”. This pattern of communication seemed to limit interaction speed and engagement when compared with the extracts (and the rest of the material), which are more dialogical or poly-vocal, and with the moderator by the whiteboard (Angie) both recording and participating in the discussions as a peer (rather than being a gate-keeper of turn-taking).




	<p>Neil: Yeah, but we talked about, ehm, what do you call it, involve the audience in that role play, maybe in groups do a role play (7.0)</p> <p>Jack: A role play? (1.0)</p> <p>Others: Yes, Yeah (2.0)</p> <p>Jack: That's nice</p> <p>Neil: That's fun</p> <p>Angie: Does everybody know what it was that we talked about?</p> <p>Laura: No</p> <p>Angie: All right – fine</p> <p>Neil: It is–</p> <p>Angie: Then you better explain it (2.0)</p> <p>Neil: It is just a suggestion for a role play, but I don't know if it will be too complicated, now that we don't have much time to do it all (1.0) but it was something like dividing people into some groups that, ehm, (1.0) that each should represent parts of society where they could themselves be confronted, in their groups – they could be confronted with some of the problems there are when they are in that situation they have been put in – then we would first have to write – explain to them their situation in advance (1.0) and then from that information they have about their (1.0) role life that, ehm, then choose some things and then we should summarize afterwards what consequences their choices would have for those social groups, ehm,</p> <p>Laura: Which social groups might that be for an example?</p> <p>Neil: But, ehm, it could be for example an – I don't know, what do you call it, a peasant or what do you call it a plantation owner with his family with kids that need an education and all, and then a big businessman that might be importing bananas from the US, and I don't know</p>
	
	

Table 1: 8 August 2005 – Discussions of a role-play as a format for the presentation

While they like the idea of the role play, they later agree that it might be too difficult to carry out in practice. This conclusion is based on a longer discussion, but some of the problems they anticipate are already raised by Neil in the shorter extract above. He mentions time and complexity as potential barriers, but also they discuss how open-ended or pre-determined the scenarios they would present to the different groups in the audience should be. They found that a very open-ended approach might generate too many scenarios, which would be difficult to moderate and synthesize. However, they thought strongly framed, pre-defined scenarios would potentially just reproduce their own ideas, not really inviting the participants' perspectives into the discussion. Coming up with the idea

of a role play shows that they are familiar with different genres or “*languages*” of presentations. However, their discussions also demonstrate how they actively use this knowledge of the *language* or requirements of that particular type of presentation to reflect on the idea, “simulate” its execution, and anticipate potential problems.

The idea of creating the presentation as a role play is interesting viewed as an example of the students' ability to reflect critically on their own role as *producers*. The idea of locating the participants as active co-producers shows a complex awareness of the *audience* of their own production. By inviting participants to represent different voices, they demonstrate a complex awareness of both the problem and the communicative context, as these voices might represent certain “biased” or “positioned” responses to the problem of poverty (which Neil exemplifies by contrasting a peasant and a businessman). This also exemplifies aspects under the broader label of “Presentation, Production and Performance”, as they imagine using the surroundings as a form of problem solving, while also experimenting with identities (those of the audience). Their own identities, however, became important, as they grew increasingly aware of their own bias as *producers*. Shortly, before the extract presented in table 2 (where they discuss creating movies and animations) they considered the creation of a narrative comparing situations where a person breaks a leg in a country with taxes and public health care vs. in a country without. They were thinking about comparing Denmark with other countries (e.g. Costa Rica) but became increasingly concerned with their own Danish or Scandinavian perspective. As culturally embedded in a welfare system with high taxes, a high degree of economic equality and free health care, school, university, etc. they tended to view the Scandinavian societal model as the best way of resolving the issue of poverty. However, they became increasingly sensitive to their own “Scandicentric” cultural bias, and would remind each other that alternative values and societal models existed (that which Buckingham refers to as *representation*). The format for these narratives, which ended in an animation/cartoon contrasting the fictional “land of no taxes” with “a land of taxes”, is what is being discussed in the following extract.



	<p>Angie: You could also, we could also do it like, we do some kind of movie right, then it starts with a normal picture of one of those persons we meet today and then their name and job are there, and things like that – here comes his story or something like that, right – and then we create a story – then we create some story about him breaking his leg or something like that – “Whoa” something right – and we do that with matchstick men, but there will just be some picture of him from the start</p>
	<p>Jack: You could also do that with a movie, that is to – I mean, instead of doing these, I mean, narratives with movies, then you can create – we are going to have some interviews from all of this?</p> <p>Sophia: Yeah, we have to use it for visualisation – hey</p> <p>Jack: Yeah, yeah, so if we are going to do some interviews it is a damn good idea doing those with a movie because it doesn't take as much time either, and then people can better understand it</p> <p>Angie: Yeah</p> <p>Jack: Instead of us standing there reading something aloud for example</p> <p>Angie: So we could do something (gestures) a combination of it all?</p> <p>Jack: Yeah, where we incorporate many different things</p>

Table 2: 8 August 2005 – discussion of presentation format

From the extracts (and the final presentation itself) it is clear that aspects such as performance, narrative, story, visualisation and action are important to them. This is highlighted above where

they discuss various types of multimodal narratives, rather than static montages. These different means were not used as “bells and whistles” but were, in the participants’ own words, created as a way of getting the message across by capturing the interest and attention of the audience. This is also emphasized by Jack’s statement about “instead of us standing there reading something aloud”, which reflects their understanding of purely textual/oral presentations as disengaging (or boring). In the extracts, albeit very short, we can sense how participants are familiar with many different media and means (the *language*) for presenting their arguments and narratives (static montages, video, and animations). The final presentation incorporated all of these means, while also including music and a detailed choreography for how the students would use the stage during the presentation. Before progressing to the final discussion it is also worth noting the degree of collaboration and work skills, e.g. the use of the whiteboard and the (very talented) moderation carried out by Angie at the whiteboard, who both documented the discussions and entered into the debates. We can also glimpse how participants are planning ahead during these discussions (exemplified by Jack’s suggestion of filming the interviews so as to use the videos in the presentation), and how the young people are trying to simulate or anticipate potential problems with their role play idea.

Literacies and pedagogies

The young people represented in this case were digitally literate in many ways. This is clear when viewing and analysing the process as a whole (Ryberg 2007), and in the final presentation where they use diverse means such as video-interviews, graphs, animations and pictures to support their arguments and oral presentation (see endnote 1). We can see this even from the small extracts and examples provided in this paper. We can glean from the participants’ conversations how they were able to reflect critically on their own roles as producers, and how they were familiar with different genres or languages of presentations (which is evident in the final presentation). Although the analysis and examples in the present paper are merely illustrative of this, it is worth noting that we can point to empirical examples of what it might mean to be digitally literate in practice, thereby providing a bridge between high-level, macro descriptions of literacy and actual micro-practices. What is equally important to note about these literacies, as we see them unfolding in practice, is their composite and organic nature. In the examples, literacy components such as representation, audience, language, production, play, performance or collaboration are intertwined, blended and weaved into the entire activity of producing a coherent argument and presentation. Rather than illustrating a number of easily discernible operational or functional skills, the examples highlight abilities to construct a coherent narrative, collaborate, organize a complex work process, and critically combine various forms of expression into a proper presentational format. This echoes points made by Buckingham (2006) and Knobel & Lankshear (2006), namely that digital literacies are critical, rather than simply functional in nature. They warn against dissecting literacies into smaller self-contained skills or “functional” operations such as searching for information, finding pictures, creating graphics, word processing or video-editing. These are not just universal or generic skills which can be implemented in different practices or activities, as the analogy below eloquently illustrates:

Writing a doctoral thesis is a radically different practice from writing a shopping list. [...] To think of these practices as different manifestations of some «thing» called literacy is like thinking of building a bridge and building a warehouse as different manifestations of mixing cement. (Lankshear & Knobel 2006, p. 17)

This should prompt us to think about how young people become able to master different practices (such as addressing a global problem and presenting findings to a big audience) involving digital

technologies and requiring digital literacy, rather than how to teach digital literacies as an array of functional operations embedded in curricular units.

Our argument is that one way of accomplishing this, is to adopt a more problem based learning approach. Firstly, this can enable settings where students have to engage in identifying and collecting relevant material to address problems that are meaningful and relevant to them. Secondly, because this entails an element of knowledge production (identifying a solution to a problem, rather than only acquiring a given body of knowledge), and can involve (multimodal) dissemination in the forms of for example projects or presentations. As mentioned, there are many different interpretations of what PBL is, but it should be considered a strength, as it allows teachers and institutions to create variations, which suit their particular context and challenges. In this case the learning process was very open-ended and problem oriented, and the collaborative work was mainly organized by the participants themselves (which they stated in the interviews were highly motivating). While it might not always be feasible or possible to give students the same degree of freedom and control as in this case, freedom and self-management are important factors to take into consideration when designing learning to support the development of digital literacy.

While the case discussed may not be directly transferable to a regular school setting the factors highlighted have also been emphasized by other authors and studies. Holm Sørensen argues that young people favour acting, producing, creating, collaborating, exploring and controlling the processes they engage with (Holm Sørensen et al. 2010). Likewise, Facer et al. (2003) propose that these traits are what characterize young people's use of technologies outside school, when they engage in what they term "authentic learning experiences". Authentic tasks, with technology embedded naturally into collaborative activities, are important for learners' motivation and for developing the necessary skills (Facer et al. 2003). Furthermore, experiences from a larger Danish research project: ICT in New Learning Environments illustrated how students could bring their forms of informal learning into the school context. This happened particularly when the school had undergone physical alterations and when the organization of learning and teaching was restructured, with PBL becoming an important part of schoolwork; and with the media readily available in the learning environment (Holm Sørensen et al. 2010).

These are what we would term changes at the meso-pedagogical level, where a particular approach to teaching and learning has been institutionally adopted, while retaining a high degree of openness and negotiability for the teachers (Holm Sørensen et al. 2010.). Admittedly, the changes in the project cited above were far from trivial, they were not injected or mandated from above, but adopted and negotiated between teachers, parents, students and the school as a communal learning process.

In line with the conclusions from these and other studies, we argue that important factors in enabling students to engage with digital literacy as part of organic, holistic practices or activities (while retaining a focus on the critical literacies needed in schools), are exploratory approaches, problem orientation, student control and also providing students with access to and control over various digital technologies. However, such changes need to be supported through the introduction of meso-level pedagogical approaches or strategies, which do not leave it up to teachers alone to identify fruitful ways of engaging with digital literacies, and do not inject rigid, detailed and prescriptive frameworks and curricular units into the classrooms.

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1 The summary and overview of the entire presentation can be found here: <http://www.hum.aau.dk/~ryberg/phdappendix/A1%20-%20Description%20of%20Presentation.pdf>